

Flurbiprofen: A Potent Pain Reliever

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Abstract

Flurbiprofen, a non-steroidal anti-inflammatory analgesic drug is a phenylalkanoic acid derivative. It is used in degenerative joint disease, rheumatoid arthritis, allied conditions and ankylosing spondylitis. In this review article we have compile its chemistry pharmacokinetic study, dose mode of action and its uses.

Keywords: Flurbiprofen; Pharmacokinetics; Dose

Chemistry

Flurbiprofen, a non steroidal anti-inflammatory drug is a phenylalkanoic acid derivative (2-2-Fluoro-4-biphenyl 4-yl, propionic acid) having molecular weight 244.3 g/mol with molecular formula of C₁₅H₁₃FO₂ [1-3]. Flurbiprofen is commercially available as a racemate blend of (+) Sand (-) R-enantiomers. The enanteomeric form of the drug has potentially developing role in the treatment of Alzheimer's disease and metastatic prostate cancer with anti-inflammatory activity [4-5]. Davis et al in 2000 observed the significant stimulatory effects on intestinal permeability in rats followed single oral doses of Flurbiprofen as racemate and enantiomer [6] (Figure 1).

Pharmacokinetics

Flurbiprofen completely absorbed after oral administration [7] with peak plasma levels occurring at 1 hour Plasma concentration is related to dosage in the range 15 to 150 mg and peak plasma concentration is about 12µg/ml after a 100 mg dose and is usually attained 1.5 to 3 hours after ingestion [8,9]. Flurbiprofen is 99% bound to human serum albumin [10,11]. Flurbiprofen undergoes rapid oxidative metabolism and is excreted primarily in the urine as both glucuronide and sulphate conjugates and approx 20% of drug eliminated unchanged [10,11]. There are no known active metabolites in humans and there is no evidence of dose dependent alterations of pharmacokinetics or of drug accumulation in plasma after multiple dose administration. The elimination half-life is about 3.5 hours during repeated doses [12]. Gastric emptying rate is found notably higher in fed state [13]. Flurbiprofen is a CYP2C9 substrate and modification of the Dose adjustments are recommended when given with inhibitor of CYP2C9 agents [14]. Flurbiprofen gastrointestinal tolerance is considered better than other NSAIDs i.e. indomethacin and aspirin, and comparable to naproxen and ibuprofen. It has shown no problematic or irreversible hepatotoxic, carcinogenic or teratogenic effects. Hypertensive and renal effects are probably similar to other NSAIDs.

Dose

150-200 mg dose is recommended daily. 300 mg is the maximum daily dose. Drug should administer with food to prevent stomach upset [15].

Mechanism of Action: (Rephrase)

Flurbiprofen inhibits the enzyme (cyclooxygenase I and cyclooxygenase II) the makes prostaglandins which results in the valuable reduction in the concentrations of prostaglandins [16].

Indications

Flurbiprofen tablets are used in the management of acute or long-term treatment of osteoarthritis, rheumatoid arthritis, joint stiffness and dysmenorrhea [17,18] gout, ankylosing spondylitis, periodontitis, reduction postoperative pain, propofol injection pain, and in initial treated pain induced from cancer, Topical ophthalmic flurbiprofen preparations are also used to prevent intraoperative miosis [19].

Dosage Forms

It is available as 50 mg and 100 mg tablets and also as 0.03% ophthalmic solution [20]. Micro and nano emulsions are also reported in literature.

Drug Interactions

Flurbiprofen is shown to interact with Quinolone antacids, Aetaminophen, Fluconazole, Dapsone and Insulin [21-27]. Significant increase in toxicities of warfarin (anticoagulants), Lithium, Methotrexate and Cyclosporine are reported with Flurbiprofen. Reduction in urinary volume, sodium, and potassium concentration is also reported with concomitant use of furosemide and Flurbiprofen.

Other Interactions

Grape and cranberry juice significantly alters the drug clearance

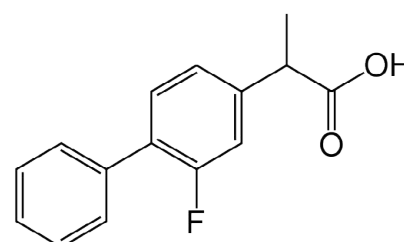


Figure 1: Structure of flurbiprofen.

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while pomegranate and blurberry showed no pharmacokinetic interaction with flurbiprofen [28-32].

Side Effects

Serious effects are dose related including ulcerations, burning, cramps, nausea, gastritis. GI bleeding, and liver toxicity is also reported with long term use. Rare effects range from Rash, ringing in the ears to lightheadedness [28].

Caution

Risk of upper gastrointestinal ulcer, asthma, heart failure, hives, impaired kidney function patients associated with selective cyclooxygenase inhibitors.

Pregnancy and Lactation

Flurbiprofen is contraindicated in pregnancy and also nursing.

Overdose

Overdose symptoms include nausea, stomach pain, vomiting, drowsiness, dizziness, less urination, problem breathing, and fainting [12,21].

Efficacy and Safety

Comparable efficacy of flurbiprofen is reported with acetaminophen and codeine in post-operative dental pain [33-37]. Flurbiprofen axetil used to decrease the pain at the site of injection. However, flurbiprofen efficacy in reducing pain sensation for propofol injection is inconsistent [38]. In another study flurbiprofen was also reported as efficient and suitable for topical application when compared with diclofenac sodium for treatment of soft-tissue rheumatism [39-47].

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